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AMENDMENT UNDER 37 C.F.R. § 1.312

Serial Number: 10/081,439

Filing Date: February 20, 2002

Title: EVAPORATED LAALO₃ FILMS FOR GATE DIELECTRICS

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Dkt: 1303.046US1

In the Claims

1. (Original) A method of forming a gate dielectric on a transistor body region, comprising:
evaporating Al₂O₃ at a first rate;
evaporating La₂O₃ at a second rate; and
controlling the first rate and the second rate to provide a film containing LaAlO₃ on the transistor body region.
2. (Original) The method of claim 1, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes evaporating dry pellets of Al₂O₃ and La₂O₃.
3. (Original) The method of claim 1, wherein evaporating La₂O₃ includes evaporating La₂O₃ by electron beam evaporation.
4. (Original) The method of claim 1, wherein controlling the first rate and the second rate includes controlling the first rate and the second rate to selectively provide a film composition having a predetermined dielectric constant.
5. (Original) The method of claim 4, wherein selectively providing a film composition having a predetermined dielectric constant includes providing a film composition with a dielectric constant ranging from the dielectric constant of an Al₂O₃ film to the dielectric constant of a La₂O₃ film.
6. (Original) The method of claim 1, wherein controlling the first rate and the second rate to provide a film containing LaAlO₃ includes providing an amorphous LaAlO₃ film.
7. (Original) The method of claim 1, wherein evaporating La₂O₃ begins substantially concurrent with beginning evaporating Al₂O₃.

8. (Original) The method of claim 1, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes depositing LaAlO₃ on the transistor body region in a base pressure lower than about 5x10⁻⁷ Torr and in a deposition pressure lower than about 2x10⁻⁶ Torr.
9. (Original) The method of claim 1, further including annealing the transistor body region after providing the film containing LaAlO₃.
10. (Original) The method of claim 9, wherein annealing the transistor body region after providing the film containing LaAlO₃ includes annealing in N₂.
11. (Original) The method of claim 10, wherein annealing in N₂ includes annealing in an electric furnace at about 700°C.
12. (Original) The method of claim 10, wherein annealing in N₂ includes annealing in RTA in the range from about 800°C to about 900°C.
13. (Original) A method of forming a gate dielectric on a transistor body region, comprising:
evaporating Al₂O₃ at a first rate using a first electron gun;
evaporating La₂O₃ at a second rate using a second electron gun; and
controlling the first rate and the second rate to provide a film containing LaAlO₃ on the transistor body region.
14. (Original) The method of claim 13, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes evaporating dry pellets of Al₂O₃ and La₂O₃.
15. (Original) The method of claim 13, wherein controlling the first rate and the second rate includes controlling the first rate and the second rate to selectively provide a film composition having a predetermined dielectric constant.

16. (Original) The method of claim 15, wherein selectively providing a film composition having a predetermined dielectric constant includes providing a film composition with a dielectric constant ranging from the dielectric constant of an Al₂O₃ film to the dielectric constant of a La₂O₃ film.
17. (Original) The method of claim 13, wherein controlling the first rate and the second rate to provide a film containing LaAlO₃ includes providing an amorphous LaAlO₃ film.
18. (Original) The method of claim 13, wherein evaporating La₂O₃ begins substantially concurrent with beginning evaporating Al₂O₃.
19. (Original) The method of claim 13, wherein forming the gate dielectric includes growing the film containing LaAlO₃ at a growth rate in the range from about 0.5 nm/min to about 50 nm/min.
20. (Original) The method of claim 13, further including annealing the transistor body region after providing the film containing LaAlO₃.
21. (Original) A method of forming a gate dielectric on a transistor body region, comprising:
evaporating Al₂O₃ at a first rate using a first electron gun;
evaporating La₂O₃ at a second rate using a second electron gun;
controlling the first rate and the second rate to provide a film containing LaAlO₃ on the transistor body region; and
annealing in N₂ after providing the film containing LaAlO₃ on the transistor body region.
22. (Original) The method of claim 21, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes evaporating dry pellets of Al₂O₃ and La₂O₃.

23. (Original) The method of claim 21, wherein controlling the first rate and the second rate includes controlling the first rate and the second rate to selectively provide a film composition having a predetermined dielectric constant.

24. (Original) The method of claim 21, wherein controlling the first rate and the second rate to provide a film containing LaAlO₃ includes providing an amorphous LaAlO₃ film.

25. (Original) The method of claim 21, wherein evaporating La₂O₃ begins substantially concurrent with beginning evaporating Al₂O₃.

26. (Original) The method of claim 21, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes depositing LaAlO₃ on the transistor body region in a base pressure lower than about 5×10^{-7} Torr and in a deposition pressure lower than about 2×10^{-6} Torr.

27. (Original) The method of claim 21, wherein annealing in N₂ includes annealing in an electric furnace at about 700°C.

28. (Original) The method of claim 21, wherein forming the gate dielectric includes growing the film containing LaAlO₃ at a growth rate in the range from about 0.5 nm/min to about 50 nm/min.

29. (Original) A method of forming a transistor, comprising:
forming first and second source/drain regions;
forming a body region between the first and second source/drain regions;
evaporating Al₂O₃ at a first rate;
evaporating La₂O₃ at a second rate;
controlling the first rate and the second rate to provide a film containing LaAlO₃ on the body region; and
coupling a gate to the film containing LaAlO₃.

30. (Original) The method of claim 29, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes evaporating dry pellets of Al₂O₃ and La₂O₃.
31. (Original) The method of claim 29, wherein controlling the first rate and the second rate includes controlling the first rate and the second rate to selectively provide a film composition having a predetermined dielectric constant.
32. (Original) The method of claim 29, wherein selectively providing a film composition having a predetermined dielectric constant includes providing a film composition with a dielectric constant ranging from the dielectric constant of an Al₂O₃ film to the dielectric constant of a La₂O₃ film.
33. (Original) The method of claim 29, wherein controlling the first rate and the second rate to provide a film containing LaAlO₃ includes providing an amorphous LaAlO₃ film.
34. (Original) The method of claim 29, wherein evaporating La₂O₃ begins substantially concurrent with beginning evaporating Al₂O₃.
35. (Currently Amended) A method of forming a memory array, comprising:
forming a number of access transistors, comprising:
 forming first and second source/drain regions;
 forming a body region between the first and second source/drain regions;
 evaporating Al₂O₃ at a first rate;
 evaporating La₂O₃ at a second rate;
 controlling the first rate and the second rate to provide a film containing LaAlO₃ on the body region[[. . .]]; and
 coupling a gate to the film containing LaAlO₃;
 forming a number of wordlines coupled to a number of the gates of the number of access transistors;

forming a number of sourcelines coupled to a number of the first source/drain regions of the number of access transistors; and

forming a number of bitlines coupled to a number of the second source/drain regions of the number of access transistors.

36. (Original) The method of claim 35, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes evaporating dry pellets of Al₂O₃ and La₂O₃.

37. (Original) The method of claim 35, wherein controlling the first rate and the second rate includes controlling the first rate and the second rate to selectively provide a film composition having a predetermined dielectric constant.

38. (Original) The method of claim 37, wherein selectively providing a film composition having a predetermined dielectric constant includes providing a film composition with a dielectric constant ranging from the dielectric constant of an Al₂O₃ film to the dielectric constant of a La₂O₃ film.

39. (Original) The method of claim 35, wherein forming the gate dielectric includes growing the film containing LaAlO₃ at a growth rate in the range from about 0.5 nm/min to about 50 nm/min.

40. (Currently Amended) A method of forming an information handling system, comprising:
forming a processor;
forming a memory array, comprising:

forming a number of access transistors, comprising:

forming first and second source/drain regions;

forming a body region between the first and second source/drain regions;

evaporating Al₂O₃ at a first rate;

evaporating La₂O₃ at a second rate;

controlling the first rate and the second rate to provide a film containing LaAlO₃ on the body region[[. .]]; and

coupling a gate to the film containing LaAlO₃;

forming a number of wordlines coupled to a number of the gates of the number of access transistors;

forming a number of sourcelines coupled to a number of the first source/drain regions of the number of access transistors;

forming a number of bitlines coupled to a number of the second source/drain regions of the number of access transistors; and

forming a system bus that couples the processor to the memory array.

41. (Original) The method of claim 40, wherein evaporating Al₂O₃ and evaporating La₂O₃ includes evaporating dry pellets of Al₂O₃ and La₂O₃.

42. (Original) The method of claim 40, wherein evaporating La₂O₃ and evaporating Al₂O₃ includes evaporating La₂O₃ and evaporating Al₂O₃ by electron beam evaporation.

43. (Original) The method of claim 40, wherein controlling the first rate and the second rate includes controlling the first rate and the second rate to selectively provide a film composition having a predetermined dielectric constant.

44-67. (Canceled)